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Ohio Fertilizer Recommendations for 1953

Compiled by Earl Jones, Extension Agronomist

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Liberal Fertilization Boosts Yields and Income

FARM account records shows that farmers who have good crop yields and good livestock production have the highest incomes. An essential practice leading to good yields is the liberal use of fertilizers year after year.

Everyone's farm needs soil building and conservation practices. A farmer can obtain more profits from his crops by increasing fertilizer applications. He can get this profit by using 250 pounds or more per acre per year for each rotation. He will need, however, to put the heavier applications on the more responsive crops.

The application you use when a new meadow or green manure crop is started with a small grain or alone is an important fertilizer application of the rotation.

You will find it profitable, too, as well as essential, to fertilize regularly all your permanent pastures and the meadows used for hay, silage and pasture. These high quality sod crops are essential in good farming and their quality and yields can be kept as desired only with proper fertilization and if other management practices are also good.

Fertilization Works Better With Good Management

You will receive best returns from commercial fertilizers if other sound management practices are a part of your farm program. For instance, most field crops—especially alfalfa and sweetclover—do best if soils have a pH of 6.5 to 7.0. Liming as needed corrects soil acidity and supplies calcium and magnesium, both necessary for good plant growth.

Let's take another example . . . manure. The farmer who handles and stores manure carelessly loses much potash and nitrogen. To get the most from manure, haul it directly from the stable to the land or store it under cover.

Each ton of protected manure equals about 100 pounds of 10-5-10 fertilizer. Five to eight loads of manure per acre, applied as a top-dressing on wheat in the fall and winter, will boost the growth of meadow and green manure crop seedings, especially on less productive, light-colored soils. This also reduces erosion on sloping land. Where wheat frequently lodges, it is best to use only strawy manure.

Keep Nutrients at Home

Other management practices help keep nutrients at home. On sloping land strip cropping, contour cultivation, and terracing help hold soil, water, organic matter,

lime and fertilizer in place. Thick-growing sod crops are the backbone of conservation farming, but they alone cannot do the job on rolling or hilly lands.

Legume-grass sod or green manure crops provide the best way of renewing good soil structure or tilth and are especially valuable on heavy soils. By using them in a rotation with soil depleting crops, you can restore organic matter, nitrogen and tilth.

Sometimes it is difficult to keep nutrients at home. A cash grain farmer may remove straw after grain harvest to help a new seeding. Mineral nutrients that are lost per acre equal those found in about 135 pounds of 0-9-27. Each ton of alfalfa hay removes about 10 pounds of phosphoric acid and 40 pounds of potash.

How Grades Are Figured

As you know, fertilizer is sold by grade. This is expressed by a series of figures which give the analysis of the fertilizer in percentages. Take 4-12-8, for example. That means there is 4 percent nitrogen, 12 percent phosphoric acid, and 8 percent potash.

Use the soil testing service of the Agricultural Extension Service available through your County Extension Agent. Get directions for taking samples and take them to the County Extension Agent well in advance of the time of ordering fertilizers. There is a small fee for this service. The laboratory is very busy just before planting time and it may be a month before you get the results of the tests and the recommendations during the busy period.

Phosphoric acid can be stored in the soil without appreciable loss except by removal in harvested crops. Experiments indicate that once the phosphorus level of most Ohio soils has been raised to a medium status, an application of 45 to 50 pounds per acre of P_2O_5 per acre per year during the rotation is satisfactory and profitable.

Potash—Within economical limits of application, potash can also be stored in the soil without serious losses from leaching. Legumes remove much more potash from the soil than do other field crops. Legumes yield more and live longer when the soil potash supply is kept high. However, when it is kept excessively high, the legume crops take more potash from the soil than they really need. For this reason, most fertility programs ration the amount of potash to the legumes by applying it every year instead of in one large application. This system of rationing the amount of pot-

Recommended Grades

Recommended Grades of Fertilizer

Ratios	Minimum Grades	High-Analysis Grades
0-1-1	0-12-12	0-14-14 and 0-15-15 and 0-20-20
0-1-2	0-10-20	
0-1-3	0-9-27	0-10-30
0-2-1	0-20-10	
1-1-1	8-8-8	10-10-10 and 12-12-12
1-4-4	3-12-12	4-16-16 and 5-20-20
1-3-6	3-9-18	
1-3-2	4-12-8	5-15-10
1-2-2	5-10-10	6-12-12 and 8-16-16
2-1-1	12-6-6	
1-4-2	4-16-8	5-20-10 and 6-24-12

Equivalent use of higher analysis grades is all right and most economical.

Soil Tests Reveal Special Needs

Soil tests will indicate whether or not your soils have any special deficiencies. What fertilizer ratios are needed? Do you need to build up a reserve of one or more nutrients?

ash to legumes is important only on fields where legume stands are being held down for more than 2 years. Potash reserves can be safely stockpiled in the soil where cropping systems do not involve stands of legumes which stand for more than 2 years.

There is a smaller drain on the potash soil reserves when crop residues are left on the field and when protected manure is applied.

Nitrogen is the one component of commercial fertilizer that cannot be stored readily in the soil. Usually the effects of mineral nitrogen can be held over in the soil only after it is incorporated into the soil organic matter. Such organic matter releases nitrogen as it decomposes. The mineral nitrogen applied from commercial fertilizers usually has had its effect within 6 months following its application. In actual practice the effects of the nitrogen are noticeable on crops within a very short time after it is applied. Applications are made to meadows and pastures, largely grass, to furnish extra production when needed. In many cases, the farmer must use his judgment about the need for nitrogen fertilizers.

Prevent Nitrogen Deficiency

There is a special place for nitrogen when organic matter high in carbon and low in nitrogen is applied to or left on the soil. These materials supply food for soil organisms which become very active and increase in numbers. The bacteria require nitrogen to build up their own bodies. If the organic matter is low in nitrogen (corn stalks or small grain and soybean straw), the microorganisms use whatever nitrogen is available in the soil and this results in a deficiency of nitrogen for the growing crop. It is usually profitable to apply commercial nitrogen to corn and grain crops when carbonaceous crop residues are being turned under or left on the soil.

More carbonaceous crop residues are now left in the fields than in the past and the use of nitrogen fertilizer to prevent nitrogen deficiencies is becoming more important.

Limit Nitrogen and Potash Application Near Seeds

The nitrogen and potash materials used in mixed fertilizers are water-soluble. These materials may cause trouble if applied too close to the seed or to plants being transplanted. There is more likely to be trouble when the soil is dry.

The phosphate materials are not water soluble and can be applied in direct contact with the seed without injury.

Fertilizer Treatments For Important Crops

Corn—Make row applications at least 300 to 400 pounds per acre of ordinary grades on both drilled and checked corn. Limit hill applications to 150 pounds per acre. Apply in the row standard grades at rates not to exceed 60 pounds of nitrogen and potash or a combination of the two. Heavier applications have been made without damage when the soil moisture content was above normal.

Use grades 3-12-12, 4-16-8, 4-12-8, 5-10-10, 6-12-12, 8-16-16, or 10-10-10. On sandy, muck and peat soils use 3-9-18.

Apply extra nitrogen (60 to 80 pounds of element nitrogen) except when corn follows good legume sods or when at least 8 to 10 tons of manure (not strawy) are applied per acre on the corn. This is especially important when corn follows corn or soybeans (residue left on the field), grass sods, etc. Use unless the soil can furnish an adequate supply of nitrogen.

Broadcast nitrogen fertilizers before plowing or sidedress after corn starts growing. Avoid deep sidedressing close to corn to reduce root cutting. Plow under all applications of 80 pounds of N or more per acre. Use heavier applications where rate of planting is adequate, soil tilth favorable, and nitrogen supply short.

Plant at least 15,000 seeds per acre when expecting 90 to 100 bushels of corn.

Fifty pounds of nitrogen per acre may be supplied by using 250 pounds of sulfate of ammonia or cyanamid, 150 pounds of ammonium nitrate, or 325 pounds of nitrate of soda.

Anhydrous ammonia and nitrogen solutions properly applied may be substi-

tuted for dry forms of nitrogen (use equal amounts of N) when facilities for handling them are available.

Small Grains—Apply at least 400 to 500 pounds per acre. Use 4-16-8, 5-10-10, 3-12-12, 5-20-20, 8-16-16 and 3-9-18 on sandy muck and peat soils. On very productive soils and for wheat seeded near fly-safe date following oats or corn with stalks removed, use 0-20-20 or 0-20-10.

Wheat fertilized at seeding time but with poor growth needs 20 to 30 pounds of nitrogen per acre in the spring. Use particularly on less productive soils and for late seeded wheat following corn and soybeans. Broadcast fertilizer in March in southern Ohio and from March 1 to April 15 in northern Ohio.

When oats usually make poor growth under the existing conditions and the variety is not apt to lodge, use the same nitrogen application as for wheat above. Plow under or apply at seeding time in 8-8-8 or other grades high in nitrogen.

On soils that have not been adequately fertilized and limed in the past, an application of fertilizer containing nitrogen on the wheat in the spring may mean a better stand of the new seeding. This is especially important where the rate of fertilization of wheat in the fall is inadequate. Two hundred to 300 pounds of 10-10-10 may be used when a need for nitrogen is clearly indicated. Otherwise, 5-10-10 or 3-12-12 are suggested.

New Seedings without a Grain Crop—Use fertilizers recommended for grain crops. Band seed.

Established Alfalfa and Ladino Clover Hay or Pasture needs fertilizer high in potash. Use 200 to 300 pounds per acre yearly of 0-10-20, 0-9-27 or 0-12-12 when meadow is to be kept another year. This will maintain high yielding meadows and pastures when other management practices are good. Apply in early fall, spring, or after any harvest.

For New Seedings, 200 pounds of 0-20-0 may be run down the tube with the legume seed when seeding in wheat with a disk drill. Two hundred pounds of 0-12-12 or 0-20-10 also may be used, but the potash should not exceed 25 pounds per acre. You can broadcast the legume seed if the wheat is growing fast and wet soils keep the drill out of the field.

When seeding with oats or without a companion grain crop, arrange the hose or tubes from the clover seed box to drop the legume seed 8 inches back of the discs and directly over the fertilizer and oats band (band seeding). You gain nothing if the seeds are dropped one-half inch or more to one side of the band of fertilizer.

Permanent Pastures require 400 or 600 pounds per acre of 0-20-10 or 0-20-0 as an initial treatment. Every second or third year later, apply the same amount of 0-20-10 or 0-12-12. Use 0-20-0 if the field is completely manured.

To advance the date for early spring grazing and increase spring growth, apply 40 to 60 pounds of nitrogen per acre on fair to good sods. Do this either in the fall, winter, or early spring. Treat a third or a half acre for each cow to be grazed. If the land needs all nutrients the same year, use 600 pounds per acre of 8-8-8 or 12-6-6.

Timothy or Other Grass Meadows need phosphorus and potash as do permanent pastures. To increase yields, apply 40 to 60 pounds of nitrogen per acre in fall, winter, or early spring. Seed production of grasses is often noticeably increased by the use of nitrogen fertilizers.

Soybeans respond least of all crops to direct applications of fertilizer. They will benefit, however, if the rate of fertilization is increased on other responsive crops (corn, sugar beets, truck crops, or small grains) in the rotation. For direct application, apply 200 to 300 pounds of 0-12-12 per acre but avoid contact of seed and fertilizers.

Tobacco Plants, also, should not contact fertilizer. For cigar filler, use 600 to 800 pounds of 3-12-12 in the row. If you cannot apply in the row, broadcast 500 to 1000 pounds of 4-12-8 per acre. Other good grades are 5-10-10 and 8-8-8.

Plow under or work the fertilizer into the soil immediately after plowing to get the best results from white burley tobacco. Use 1000 pounds of 8-8-8 with half the potash in the sulfate form. Apply in the row 300 to 600 pounds of 4-12-8 or 3-12-12, preferably with half the potash in the sulfate form. An alternate treatment is the use of 600 pounds of 3-12-12 or 4-12-8 on rye or ryegrass cover crop in the fall and the plowing under of 60 pounds of nitrogen in the

spring with the row application recommended above.

Sugar Beets require a soil with a high capacity for holding usable water before profit can be attained. Good tilth is necessary and the soil's pH needs to be 6.5 to 7.0. Best place for a beet crop in a rotation is following a 2-year-old legume-grass sod.

Fertilize each acre in the row with 300 to 400 pounds of 3-12-12, 5-10-10, or 4-16-8. Use 3-8-18 on muck soils. If needed, apply more nitrogen at the rate of 60 to 80 pounds per acre. This may be broadcast and plowed under or placed on the furrow bottom. Another way of adding nitrogen is to broadcast 600 to 800 pounds of 10-10-10 per acre and cover in the same manner.

Tomatoes for Processing:

Basic Application—The fertilizer program varies considerably depending on natural fertility of soil, soil type, cropping rotation, foliage, variety, and disease control program. Apply 600 to 1200 pounds per acre, either broadcast before plowing or drilled in deeply afterwards, of one of the following grades: 3-12-12 or similar analysis on soils high in fertility or on which legumes have been grown regularly; 5-10-10 or similar analysis on light colored soils or soil where few legumes have been applied or no manure applied. On light colored soils where corn stalks, strawy or other materials low in nitrogen are being plowed under, suggest using 8-8-8 or 10-10-10 at rates of 500-700 pounds fertilizer per acre.

Maximum applications are recommended only on soils in good tilth from which maximum yields may be expected.

Sidedress Application — The response from sidedress applications of nitrogen fertilizer is erratic and generally is not recommended. If such applications are made, apply 20-30 pounds of nitrogen (100-150 pounds of ammonium sulfate or its equivalent) at last cultivation. Such applications may be helpful on sandy and light colored soils or where large amounts of dry material low in nitrogen have been plowed under.

Direct Seedings—In addition to above, apply in row 2 inches below and directly beneath the seed, 200 to 300 pounds per acre of 0-12-12, 3-12-12, or similar analysis.

Transplanting—Dissolve a starter fertilizer in the transplanter water. Select one that is high in phosphorus like 10-52-17, 3-26-13, 15-30-15, or similar materials and use according to manufacturer's directions.

Vegetables and Potatoes:

The fertilizer program varies tremendously with the particular vegetable being grown. For example, as little as 300 pounds of a complete fertilizer may suffice for sweet corn while as much as 2000 pounds may be needed with crops like early cabbage and celery. For more complete recommendations, secure a copy of "Fertilizer for Ohio Vegetable Crops" from county agents or from Department of Horticulture, Ohio State University.

Trace Elements Needed In Some Locations

With localized exceptions, most Ohio soils contain sufficient minor elements for good crop growth. In the lake bed soils of northwestern Ohio, some fields have shown a manganese deficiency on soybeans. The soybean leaves first become light green in appearance and then turn to a yellowish green with some of the lower leaves bronzing. This may be corrected with a foliage spray of 10 pounds per acre of manganese sulfate made on the growing beans as soon as the soybeans start showing discoloration of the leaves. Manganese deficiency may also be prevented by a pre-plant application of manganese sulfate. However, such pre-plant applications should be made only on the basis of a soil test since it is possible to create a manganese toxicity on soils already high in manganese.

Soil tests and field trials help determine the need for minor elements. Your county Extension agent has information concerning the materials to be used, rates of application, and crops on which applications should be made.

How to Build Reserves Of P_2O_5 and K_2O

Make fundamental applications in the row for corn, with wheat and oats and on meadows, meadow pastures and permanent pastures. Additional applications may be made as follows:

1. Fertilize meadows and meadow pastures when they have not been fertilized in the past. Apply the seeding year after grain harvest and each year until they are plowed, in the early fall, spring, or after any harvest.

2. Apply with grain drill or other applicator while preparing a seedbed for corn or after planting corn. Work into soil as deep as possible. Band applications are preferable since the phosphoric acid and potash are somewhat more effective when applied in bands than when mixed with the soil.

3. Plow under fertilizer for corn.

4. Apply on furrow bottom when plowing for corn. This requires too much time.

5. Apply about 200 to 300 pounds of phosphoric acid and about 150 to 200 pounds of potash per acre. (Note that these figures do not refer to amount of materials or mixed fertilizers.)

Suggested applications, based on soil tests:

Soils—Low in phosphoric acid and high in potash: Use phosphoric acid.
Medium in phosphoric acid and low in potash: Use phosphoric acid and potash.
Low in phosphoric acid and medium in potash: Use phosphoric acid and potash.
High in phosphoric acid and low in potash: Use potash.

We do not know exactly what changes will be made in the soil tests by these applications.

Ask your county agent for these bulletins:

"Bromegrass—Use and Culture"

"Corn Yields Climb by Management"

"Crop Varieties and Hybrids"

"Liming Ohio's Acid Soils"

"Manure: It's Management in Barn and Field"

"Spittlebug Control on Legumes"

"Labor Saving Devices for Farm and Home"

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